

What is claimed is:

1. A liquid injector for injecting a contrast medium into a subject whose fluoroscopic image is to be captured by an imaging diagnostic apparatus, comprising:
 - a liquid injection mechanism for injecting said contrast medium into said subject;
 - pattern storing means for registering data of a variable pattern in which an injection rate of the contrast medium for keeping an image contrast of the fluoroscopic image within a predetermined range varies with time; and
 - rate controlling means for varying an operating speed of said liquid injection mechanism with time according to said variable pattern.
2. A liquid injector according to claim 1, wherein said pattern storing means comprises means for registering the data of the variable pattern in order to maintain a state in which the image contrast of the fluoroscopic image that is produced by said contrast medium approximates an optimum level.
3. A liquid injector according to claim 1, further comprising:
 - total amount entering means for accepting entered data of a total amount of the contrast medium to be injected into the subject;
 - said rate controlling means comprising means for increasing or reducing said injection rate in elapsed times according to said variable

pattern depending on said total amount of the contrast medium to be injected into the subject.

4. A liquid injector according to claim 3, further comprising:
5 data entering means for accepting entered data of the body weight of the subject; and
total calculating means for increasing or reducing said total amount of the contrast medium to be injected into the subject in proportion to the body weight whose data has been entered by said data entering means.

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5. A liquid injector according to claim 3, further comprising:
coefficient storing means for registering data of predetermined coefficients assigned to respective regions to be imaged of the subject;
data entering means for accepting entered data of a region to
15 be imaged of the subject;
coefficient reading means for reading the data of one of the coefficients from said coefficient storing means depending on the region to be imaged of the subject whose data has been entered by said data entering means; and
20 total calculating means for correcting said total amount of the contrast medium to be injected into the subject by multiplying said total amount by the coefficient whose data has been read by said coefficient reading means.

6. A liquid injector according to claim 3, wherein said contract medium is available in a plurality of types having different concentrations of an effective component contained therein, further comprising:

concentration storing means for registering data of the different
5 concentrations in the types of said contract medium;

data entering means for accepting entered data of a type of the contrast medium;

concentration reading means for reading data of the concentration from said concentration storing means depending on the type
10 of the contrast medium whose data has been entered by said data entering means; and

total calculating means for increasing or reducing said total amount of the contrast medium to be injected into the subject in inverse proportion to said concentration whose data has been read by said
15 concentration reading means.

7. A liquid injector according to claim 3, wherein said contract medium is available in a plurality of types having different concentrations of an effective component contained therein, further comprising:

20 concentration storing means for registering data of the different concentrations in the types of said contract medium;

coefficient storing means for registering data of predetermined coefficients assigned to respective regions to be imaged of the subject;

data entering means for accepting entered data of at least the
25 body weight of the subject, a region to be imaged of the subject, and one of the types of the contrast medium;

concentration reading means for reading data of the
concentration from said concentration storing means depending on the type
of the contrast medium whose data has been entered by said data entering
means;

5 coefficient reading means for reading the data of one of the
coefficients from said coefficient storing means depending on the region to
be imaged of the subject whose data has been entered by said data entering
means; and

total calculating means for correcting said total amount of the
10 contrast medium to be injected into the subject, which has been increased or
reduced in proportion to said body weight and in inverse proportion to said
concentration, by multiplying said total amount by said one of the
coefficients.

15 8. A method of injecting a liquid with a liquid injector according to
claim 1, comprising the step of:

 varying an injection rate of said contrast medium with time
according to said variable pattern.

20 9. A method according to claim 8, further comprising the steps of:
 accepting entered data of a total amount of the contrast
medium to be injected into the subject; and

 increasing or reducing said injection rate in elapsed times
according to said variable pattern depending on said total amount of the
25 contrast medium to be injected into the subject.

10. A method according to claim 9, wherein said contract medium is available in a plurality of types having different concentrations of an effective component contained therein, further comprising the steps of:

5 registering data of the different concentrations in the types of said contract medium;

registering data of predetermined coefficients assigned to respective regions to be imaged of the subject;

accepting entered data of at least the body weight of the subject, a region to be imaged of the subject, and one of the types of the
10 contrast medium;

reading data of the concentration depending on the type of the contrast medium whose data has been entered;

reading the data of one of the coefficients depending on the region to be imaged of the subject whose data has been entered; and

15 correcting said total amount of the contrast medium to be injected into the subject, which has been increased or reduced in proportion to said body weight and in inverse proportion to said concentration, by multiplying said total amount by said one of the coefficients.

20 11. A computer unit for controlling operation of a liquid injection mechanism of a liquid injector for injecting a contrast medium into a subject whose fluoroscopic image is to be captured by an imaging diagnostic apparatus, comprising:

pattern storing means for registering data of a variable pattern
25 in which an injection rate of the contrast medium varies with time; and

rate controlling means for varying an operating speed of said liquid injection mechanism with time according to said variable pattern.

12. A computer unit according to claim 11, further comprising:
5 total amount entering means for accepting entered data of a total amount of the contrast medium to be injected into the subject;
said rate controlling means comprising means for increasing or reducing said injection rate in elapsed times according to said variable pattern depending on said total amount of the contrast medium to be injected
10 into the subject.

13. A computer unit according to claim 12, wherein said contrast medium is available in a plurality of types having different concentrations of an effective component contained therein, further comprising:
15 concentration storing means for registering data of the different concentrations in the types of said contrast medium;
coefficient storing means for registering data of predetermined coefficients assigned to respective regions to be imaged of the subject;
data entering means for accepting entered data of at least the
20 body weight of the subject, a region to be imaged of the subject, and one of the types of the contrast medium;
concentration reading means for reading data of the concentration from said concentration storing means depending on the type of the contrast medium whose data has been entered by said data entering
25 means;

coefficient reading means for reading the data of one of the coefficients from said coefficient storing means depending on the region to be imaged of the subject whose data has been entered by said data entering means; and

5 total calculating means for correcting said total amount of the contrast medium to be injected into the subject, which has been increased or reduced in proportion to said body weight and in inverse proportion to said concentration, by multiplying said total amount by said one of the coefficients.

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14. A computer program for enabling a computer unit according to claim 11 to carry out a process of varying an operating speed of said liquid injection mechanism with time according to said variable pattern.

15 15. A computer program according to claim 14 for enabling said computer to carry out a process comprising the steps of:

 accepting entered data of a total amount of the contrast medium to be injected into the subject; and

 Increasing or reducing said injection rate in elapsed times
20 according to said variable pattern depending on said total amount of the contrast medium to be injected into the subject.

 16. A computer program according to claim 15, wherein said contract medium is available in a plurality of types having different
25 concentrations of an effective component contained therein, said computer

program enabling said computer to carry out a process comprising the steps of:

registering data of the different concentrations in the types of said contrast medium;

5 registering data of predetermined coefficients assigned to respective regions to be imaged of the subject;

accepting entered data of at least the body weight of the subject, a region to be imaged of the subject, and one of the types of the contrast medium;

10 reading data of the concentration depending on the type of the contrast medium whose data has been entered;

reading the data of one of the coefficients depending on the region to be imaged of the subject whose data has been entered; and

15 correcting said total amount of the contrast medium to be injected into the subject, which has been increased or reduced in proportion to said body weight and in inverse proportion to said concentration, by multiplying said total amount by said one of the coefficients.

17. An information storage medium storing therein a computer
20 program according to claim 14, which is to be read by a computer unit.